

LISTING OF CLAIMS AS AMENDED

1. (Currently Amended) A method of inhibiting fouling of heat transfer surfaces in contact with petroleum or hydrocarbon feedstocks comprising heating a phosphorous-sulfur compound to yield a heat-treated phosphorous-sulfur compound exhibiting a ^{31}P NMR peak between about 93 and about 97 ppm; and thereafter

contacting the heat transfer surfaces with the heat-treated phosphorous-sulfur compound.

2. (Original) The method of claim 1 wherein the fouling is coke formation in pyrolysis furnaces during thermal cracking of hydrocarbon feedstock.

3. (Previously Presented) The method of claim 1 wherein the heat-treated phosphorous-sulfur compound is prepared by heating a phosphorus-sulfur compound at a temperature of from about 160°C to about 500°C.

4. (Previously Presented) The method of claim 1 wherein the phosphorus-sulfur compound is selected from mono- or di-substituted thiophosphate esters, phosphorothioites, phosphorothioates and thiophosphonates.

5. (Original) The method of claim 4 wherein the phosphorus-sulfur compound is a trisubstituted phosphorothioate.

6. (Original) The method of claim 5 wherein the trisubstituted phosphorothioate is a s,s,s-trialkyl phosphorothioate.

7. (Original) The method of claim 6 wherein the s,s,s-trialkyl phosphorothioate is s,s,s-tributyl phosphorothioate.

8. (Previously Presented) The method of claim 1 wherein the phosphorus-sulfur compound is a mono- or di-substituted thiophosphate ester.

9. (Currently Amended) The method of claim 8 wherein the mono- or di-substituted thiophosphate ~~thiophosphate~~ ester is a mono- or di-alkyl thiophosphate ester.

10. (Original) The method of claim 9 wherein the mono- or di-alkyl thiophosphate ester is mono- or dioctyl thiophosphate ester or mono- or di(ethyl)hexyl thiophosphate ester.

11. (Previously Presented) The method of claim 1 wherein the heat treated phosphorous-sulfur compound is prepared by heating a phosphorus-sulfur compound at a temperature of from about 180° to about 280°C.

12. (Previously Presented) The method of claim 1 wherein the heat-treated phosphorous-sulfur compound is prepared by heating a phosphorus-sulfur compound at a temperature of from about 200° to about 260°C.

13. (Previously Presented) The method of claim 1 wherein the phosphorous-sulfur compound is heated in an oxygen and water-free atmosphere.

14. (Previously Presented) The method of claim 2 comprising injecting the heat-treated phosphorous-sulfur compound into the pyrolysis furnace prior to processing the hydrocarbon feedstock.

15. (Previously Presented) The method of claim 14 wherein the heat-treated phosphorous-sulfur compound is injected into the pyrolysis furnace from about 30 minutes to about 24 hours prior to processing the hydrocarbon feedstock.

16. (Previously Presented) The method of claim 2 comprising injecting the heat-treated phosphorous-sulfur compound into the pyrolysis furnace simultaneously with hydrocarbon feedstock.

17. (Previously Presented) The method of claim 2 comprising injecting from about 1 to about 1000 ppm of the heat-treated phosphorus-sulfur compound into the pyrolysis furnace.

18. (Previously Presented) The method of claim 2 comprising injecting from about 10 to about 100 ppm of the heat-treated phosphorus-sulfur compound into the pyrolysis furnace.

19. (Currently Amended) A method of introducing a compound into a pyrolysis furnace coil comprising

heating a phosphorous-sulfur compound at a temperature of from about 160°C to 500°C for about 5 minutes to about 3 hours to yield a heat-treated phosphorous-sulfur compound; and thereafter

introducing the heat-treated phosphorous-sulfur compound into the pyrolysis furnace coil.

20. (Previously Presented) The method of claim 19 wherein the temperature ranges from about 200°C to about 500°C.

21. (Previously Presented) The method of claim 19 further comprising mixing the phosphorous-sulfur compound or the heat-treated phosphorous sulfur compound with a carrier.

22. (Original) The method of claim 21 wherein the carrier is a gas or a liquid.

23. (Original) The method of claim 21 wherein the carrier is steam.

24. (Original) The method of claim 21 wherein the carrier is an inert gas.

25. (Previously Presented) The method of claim 21 wherein the carrier is nitrogen.

26. (Original) The method of claim 21 wherein the carrier is natural gas.